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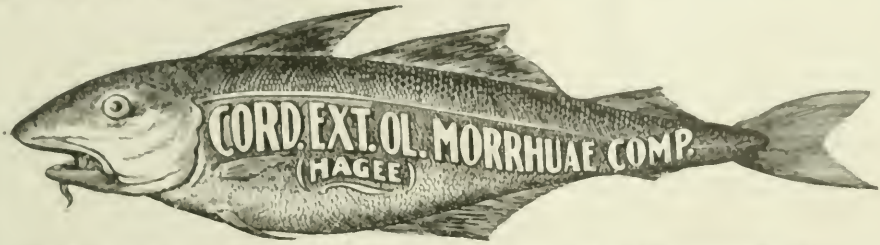

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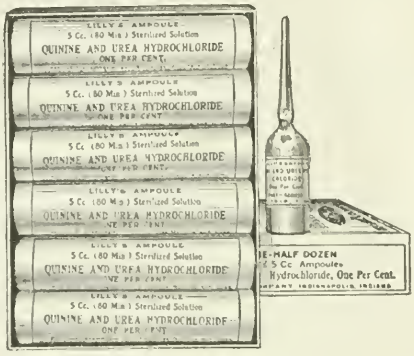

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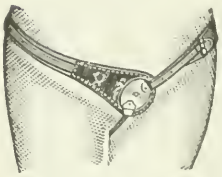

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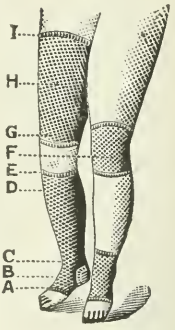

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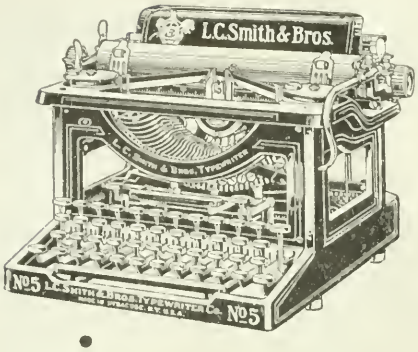

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CANCER OF THE TONGUE, BASED UPON THE STUDY OF OVER ONE HUNDRED CASES.*

By Joseph C. Bloodgood, M.D.,
Baltimore, Md.

THIS study has led to some very remarkable conclusions.

It has been demonstrated that the failure to cure when the cancer of the tongue is fully developed is due chiefly to the neglect to remove the muscles of the floor of the mouth below the cancer.

The high mortality after operations for cancer of the tongue is chiefly due to the removal of the floor of the mouth without removing a section of the lower jaw.

The investigation has also shown that if a lesion of the tongue is subjected to immediate operation within a few weeks after the onset of the lesion the chances of a permanent cure are best. In this stage it will usually be sufficient to remove the local lesion, with a good margin of healthy tissue, and this removal should be done with the electric cautery. The center of the lesion should be preserved for microscopic study. When this is done the chances are that the lesion will still be benign. But even though the lesion prove microscopically cancer, the probabilities of a cure are almost 100 per cent.

In the past surgeons have apparently removed too much of the tongue and have performed too extensive operations upon the glands of the neck. Now, this is theoretically incorrect, because cancer of the tongue infiltrates into the glands of the neck through

*Author's abstract of paper read before the American Surgical Association, New York, April 9, 1914

the floor of the mouth. Should the glands be involved and the floor of the mouth not be removed, one could hope for little, if anything, from such an operation. If the glands of the neck are not involved, this does not preclude infiltration of the floor of the mouth.

When the operation is performed in one stage it is impossible to remove the tongue, the floor of the mouth, and the glands, and then to close the opening in the mouth, unless a section of the lower jaw is also removed. If the former operation (without resection of the jaw) is done thoroughly the mortality is very high—almost 80 per cent.—from primary or secondary pneumonia, or a late infection from the oral fistula.

The author was first impressed with these facts when it was found that the first cured cases were either cancer originating in the floor of the mouth, or cancer of the tongue invading the floor of the mouth, in which it was absolutely necessary to resect portions of the lower jaw in order to remove the disease. The extent of the disease, therefore, forced the surgeon to the more radical and mutilating procedure, and allowed him to perform removal *en bloc*. During the same period earlier and more favorable cases were subjected to less extensive operations. When the floor of the mouth was not removed local recurrence always followed, and when it was thoroughly removed without resection of the jaw the patients died from the operation.

The author, in November, 1910, for the first time, deliberately, in a favorable and early cancer of the tongue, removed the right half of the tongue, the right floor of the mouth, the right half of the lower jaw and the glands on the right side of the neck in one piece. The wound was closed by suturing the mucous membrane of the right cheek to the remaining half of the tongue. The patient swallowed at once after the operation, and no recurrence followed. The microscopic study showed that the floor of the mouth was infiltrated, but the glands were free.

As the removal of the lower jaw, especially in the region of the symphysis, is mutilating, the author has attempted to accomplish the same results in a different way.

The glands of the neck are first removed, and after the operation, their connection with the floor of the mouth below the lesion is thoroughly burned with the cautery, and the wound closed. Then the lesion in the tongue or floor of the mouth is attacked with the electric cautery. The application of this is usually repeated two or more times, until everything is destroyed down to the area of the first cauterization from below. The healed skin flap of the first operation forms the floor of the mouth and prevents an oral fistula.

The first operation after this method was performed in April, 1912, two years ago. The lesion was a cancer occupying the floor of the mouth between the tongue and the symphysis of the jaw. It was about the size of a silver dollar. Permanent cures have

been accomplished in similar cases by an *en bloc* dissection of tongue, floor of the mouth, jaw and glands. The oldest case lived fifteen years, but this is a very mutilating operation, and the recent patient refused to submit to it. This led the author to attempt what he had had in mind for some years. At the present writing—two years since operation—there is no evidence of recurrence and no mutilation.

Since then four cases have received this treatment with, so far, apparent success.

The majority of cases of cancer of the tongue seek surgical aid at an unnecessarily late period. In every case the patient is warned. There is always something to be seen and felt in the tongue or floor of the mouth. If such a lesion is investigated at once, a local operation with the electric cautery should be sufficient; in a little later stage removal of the glands and repeated cauterization in the mouth; in still later stages resection of the jaw must be done. The author's recent experience seems to show that this operation should be done in stages: First, thorough removal of the glands with cauterization of the floor of the mouth from the neck wound; second, cauterization of the lesion within the mouth; third, removal of the lower jaw and cauterized area. These points will be discussed in detail with illustrative cases in the complete paper.

When the cases observed up until 1908—a period of 18 years—are compared with those observed during the past five years, the influence of education is well shown. The very early precancerous lesions have increased from 8 to 30 per cent. The late and inoperable cases have decreased from 18 to 10 per cent. The cures have increased from 21 to 50 per cent.

When the author considers the cases personally operated on by him by these newer methods in the past five years (14 in all) he finds that there has been no post-operative mortality, and so far but one patient is dead of recurrent carcinoma. In this case the lesion of the tongue had previously been subjected to operation, the recurrent tumor was extensive, and the glands of the neck involved. In this group every type of operation according to the newer methods just described is represented. At the present time there is evidence of recurrence in only one case. Here the recurrent lesion was most extensive and the operation most radical.

The experience with these 14 cases prove the point as far as the immediate mortality is concerned, because, considering *all* cases studied, the post-operative mortality has been about 22 per cent. Since recurrences, as a rule, take place within one year of the operation, the results in these 14 cases also demonstrate that the improved methods promise a much larger per cent. of permanent cures, and certainly a longer freedom from recurrence.

We have, therefore, apparently conquered the technique of operations for cancer of the tongue. Now, if we can educate men to come earlier, we shall probably conquer the disease.

THE PRESENT STATUS OF RADIOACTIVE THERAPY IN MEDICINE.

By Ernest Zueblin, M.D.,

Professor of Medicine in the University of Maryland, Baltimore, Md.

The marvelous qualities of radium have excited the interest of patient and physician alike. Owing to the untiring investigations of a few men, a great amount of scientific work has been accomplished within the past few years. Though we are only at the beginning of a new field of therapeutic development, it is interesting to recapitulate at this time the different effects of its physical properties. Radioactive substances are split up into new elements of smaller atomic weight. Three different rays are observed during this process of division: Alpha Rays, or Helium Atoms, with positive electric charge; Beta Rays, composed of electrons of the smallest negative electric units, and Gamma Rays, which are not composed of any material particles, but are attributed to an electromagnetic vibration of ether similar to light.

These three rays are produced by the radioactive substances in varying quantities and in varying mixtures. The rapidity with which this splitting process takes place is of the greatest importance, and for its estimation the term "half value" has been adopted, which is the time required for any quantity of radioactive substance to be reduced by this emanation process into the next following element to 50 per cent. of its original amount. Owing to the great difference in the time required for decomposition, the preparations vary greatly. For some purposes products with a rapid decomposition are required, for other purposes the preparations which decompose very slowly are desirable.

Radioactive substances are the carriers of energy which, set free at the moment of decomposition, yield heat and electrical chemical effect (decomposition of water by the alpha rays, ozonization of the atmospheric oxygen). The amount of energy produced during this decomposition is enormous: (1 c. c. of water during explosion yields 2 gramcalories, while 1 c. c. of radium during decomposition gives 20,000,000 calories.) The greatest amount of energy is contained in the alpha rays, which are estimated to travel at a rate of nearly 20,000 miles a second, whilst the beta rays have a velocity of about 90-100,000 miles a second. This form of energy introduced into the body cannot be without consequence to the function of the cells and the organs (Hampson[1]). Not only molecules of water, but also inorganic and organic cell complexes may be broken up. At the present time, however, our knowledge of these changes is incomplete, so we must observe the greatest care and precaution in their use for therapeutic purposes. As shown by experiments by Falta and Zehner,[2] radioactive substances (Thor. X) decolorize certain anilin dyes, oxydizes guaiac resin, aloin; pharmaceutical products are decomposed

(morphia, atropine, sod. salicylate, pilocarpine, digitalin, starch; and solutions of albumen are hydrolyzed and split up (Schwarz[68]). The effect of radioemanation upon uric acid is still under discussion. According to some authors (Gudzent,[3] His,[4] Messernitzki, Falta[181] and Zehner[8]), uric acid and monosodiumurates when in solution split up into CO_2 and NH. Thorium X seems to alter uric acid in such a way that neither the precipitation with the hydrochloric acid nor the murexid test can be obtained. Such a view is opposed by Lazarus,[9] Kerb[5] and Lazarus, Saillard,[5] Knauß, Lenz and Wiechowski,[97] Plesch,[99] Messernitzki has demonstrated the destructive influence of radioemanation upon the oxypurines. Lecithin also undergoes decomposition when treated with emanation (Kerl,[10] Schwarz, G.,[68] Schwarz and Zehner[11]); this fact has, however, lately been contested by Neuberg and Karczag,[57] Kohlrausch,[58] Sommer,[47] H. Dominici, G. Petit, A. Jaboin, A. Chauveau[60]; also Gelatine (Fuerstenberg[150]).

The different tissues and cells of the body offer a certain affinity to the radioactive substances, a similar attitude holds true for the different alkaloids, metals, metalloids, immune bodies, etc., which substances become more or less closely attached to the different cells. Although an elective binding of the radioactive substances within the body is still under discussion, certain investigations (Ebler[176], Karczag and Plesch,[12] Kionka,[13] Ramsauer and Caan[14]) speak in favor of a storage of radioactivity in the bone marrow, liver, lymph glands, kidneys, spleen, brain, serum and in the serous cavities of the body. Depots of radioactive substances under the skin (Prado Taglo[15]) are followed by more or less pronounced local reaction, hyperemia, capillary dilatation, cellular, leuco and lymphocytic infiltration, and the formation of fibroblasts, which processes finally result in scar tissue. According to the dose employed we can either stimulate or so damage the body cells that finally necrosis follows (Sommer,[47] Sticker, Van Noorden l. c., Birch Hirschfeld[248]). Further pathological manifestations resulting from an overdose of radioactive material will be mentioned later. It is probable that the greatest amount of energy that becomes free during the explosion of the radioactive molecule is electricity. Our most enthusiastic expectations that electrotherapy would cure any disease have, of course, been shattered. Recent investigative work upon the psychogalvanic reflex phenomena, however, would indicate that our knowledge upon the physiological and pathological action of electricity needs further understanding (Gildemeister,[17] Leva,[154] Gregor and Loewe,[155] Veraguth,[156] etc.). We have become more moderate, and now see in such a treatment not only a psychic means, but also a method for applying to the skin a stimulant whose intensity can be accurately gauged, and we thoroughly recognize today that most of the electric energy remains on the outer surface of the body. With the use of radioactive substances, however, we are enabled to distribute these carriers of electric energy within the body, so it is

possible to expose the humors, protoplasm, the nuclei of the cells directly to the shelling of electric explosions. Radium and radioactive substances introduced into the body are eliminated through different organs (Kahlmann,[157] Laqueur,[16 159] Fleischmann,[17] Schnee,[18] Ramsauer and Caan,[14] Kenji-Kojo[19]), chiefly by the lungs, kidneys, intestines and the skin.

Substances and Methods Used.—The only substances here considered are those recommended for internal medical purposes.

The following qualities are required:

1. Easy application for the patient, with no risk of dangerous effects, provided the proper dose is applied.

2. The time of decomposition has to be neither too short nor too slow, the best preparations being those with a half value of a few days, *i. e.*, for radium emanation and for thorium X.

3. The dose must be absolutely reliable, notwithstanding the kind of preparation used. Many of the radioactive substances on sale have given rise to complaints with reference to the proper standardizing.

The power of these preparations is valued according to electrostatic units multiplied by 1000 (M. U.) Mache units=equivalent to 1 electrostatic unit.

4. The preparation used should not be too expensive. There is in the open market a marked difference in the price paid for the same amount of energy. In the form of mineral water or in the form of radioactive compresses, this difference in price is less striking. The cheapest preparation now existing, equivalent to a bath taken at Gastein, namely, the R. E. Bath preparation from the Radium Factory Neulengbach (V. Noorden), costs about 65 cents.

Provided that careful and reliable manufacturing is maintained, the following substances are mostly recommended:

A. Radium.
   1. Emanation of radium.
   2. Radium and its salts, in solid and soluble form.

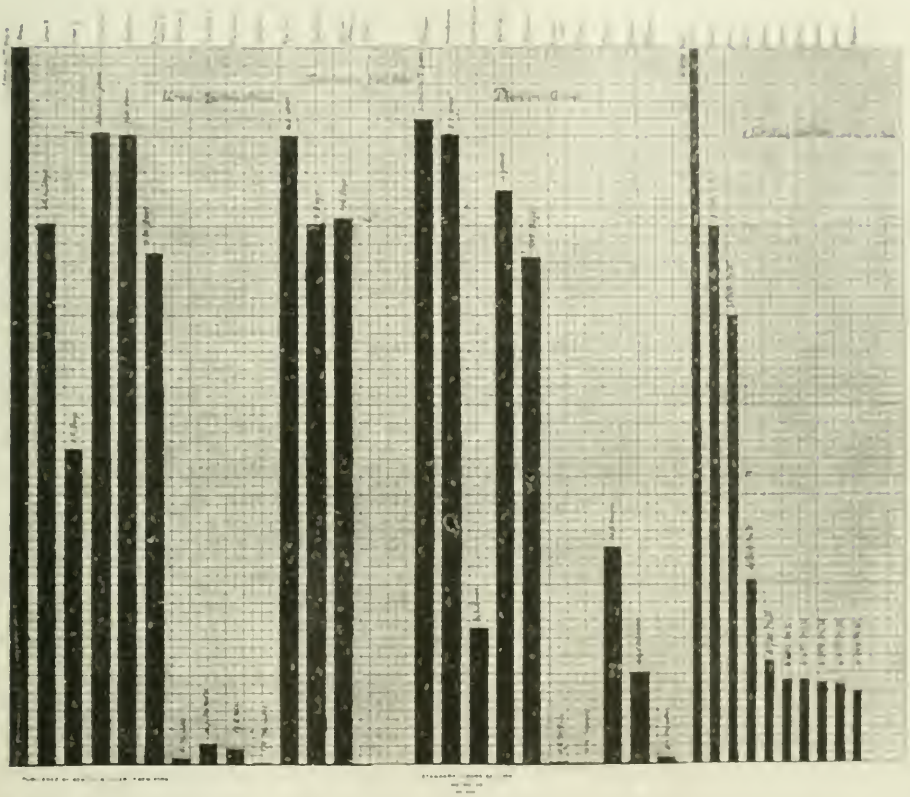
B. Thorium. Solutions of Thorium X.

A. Radium.
   a. Emanation of radium.

Metallic radium or in the form of salts decomposes into two gaseous bodies—helium, a permanent gas, and radium emanation, or nitnon (Ramsey, Lowe[164 183]), which immediately undergoes further disintegration. During this process the emanation itself can be transformed into solid compounds. During the continuous formation of the rays, a series of solid bodies Radium A-B-C-D are rapidly formed. These substances are also called active precipitates. Radium D is represented by a substance which disintegrates only slowly, and which furnishes only a small amount of beta rays. According to later investigations, radium D does not possess a powerful physiological and chemical action, contrary to a view formerly held by Gudzent,[3] P. Lazarus.[19]

The dosage of the emanation can easily be ascertained in a watery solution. The loss of emanation in a given time can be

calculated, so the solution of emanation can be given just the strength required at the moment when it is used. In spite a number of mineral springs, the action of which prior to the discovery of radioactivity could not be properly explained, is now attributed to the presence of radioactive emanation. The following table of famous springs shows the number of Mache units contained in a bath of 200 liters. More recently discovered springs are those of Joachimsthal in Bohemia. The radium kurhaus, supplied with all the modern appliances, contains in the full bath



120,000 Mache units. One spring recently discovered (Barbara) is even estimated to contain 5000 units in the liter, for one full bath 1,120,000 units. Another very powerful spring not yet completely utilized in Brambach contains 400,000 Mache units in a full bath (Van Noorden,[69] Czapski,[54] Weidig[118]).

The remnants of Pechblende left in the water render it radioactive. By this means it has become possible to prepare baths equal in strength to those of Gastein (about 30,000 Mache units) Neusser,[187, 251] Gottlieb[250]. These, it is said, act favorably upon chronic rheumatic processes. The residue left during the manu-

facture of the urancolors contains a mixture of all radioactive substances found in the series of the Uran elements, and water acting upon these substances becomes largely charged with radioactive emanation. This fact opens an immense future for the utilization of radium emanation if water be allowed to pass over rocks containing uran. Also in form of compresses with radioactive water good results were mentioned (Kraus[261]).

At the present time it must be admitted that the skin is able to absorb a certain amount of emanation (W. Engelmann,[20] Strassburger,[21] Kemen,[22] Neumann[23]), but still the greatest part in entering the body has to pass through the respiratory tract (Loewenthal,[173 244] Saubermann,[24] Smith and Bellingham,[25] Strassburger,[21] Lazarus,[19] Eckmann,[202] Berg and Welker[245]). It is admitted that one fraction of the exhaled emanation can be reabsorbed by the lungs (Lazarus[19]). In order to make the heavier emanation more available for absorption, high bathtubs have been recommended which check the escape of the gas, besides special devices which direct the emanation directly toward the mouth of the bather (Strasser and Selka,[246] Kemen,[22] Eichholz,[26] Kionka,[13 26] Scholz,[27] Lazarus,[19] Glaessgen,[28] Sommer[208]). The appliance of emanation by the electric current, cataphoresis, also has to be mentioned (Kohlrausch[29] and Meyer, Schnee,[18] Gerke,[30] Markwald,[172] Eckmann,[202] Kühnelt[220]).

As radioactive substances are found everywhere—in the soil, in water and in the air (Elster and Geitel,[31] Saake,[242] Grapley,[32] Hampson, Rutherford, Soddie,[1] Artmann,[170] Frech,[175] Gockel,[178] Grube,[181] Starke,[182] Kohlrausch[243])—it is very important to be able to determine the amount present, especially with the view of checking the advertisement of certain mineral springs which contain too small an amount of emanation to produce any therapeutic effect. The following scale may be of use:

(1) Strong radioactive springs containing 100 Mache units in one liter or more.

(2) Medium radioactive springs with 50-100 M. U. in one liter.

(3) Weak radioactive springs containing 20-50 M. U. in one liter.

With the exception of certain springs (Teplitz, Schoenau, Hauser,[160] Kolarz,[161] Artman[162]), which by means of special arrangements are enabled to render the air of the inhalation chambers very radioactive, water resorts with an emanation of less than 20 M. U. should not be allowed to advertise their springs. The second way of administering emanation is by means of inhalation, which method necessitates special rooms with airtight walls, oxygen apparatus and tanks for the absorption of carbondioxide and water; the emanation reaches the chamber through isolated pipes and air shafts (Glaessgen[28]) or by means of a ventilator. The method of radium treatment by inhalation was inaugurated by the school of Berlin, and doses applied corresponding to 2-4 Mache units per liter of air given daily for two to three hours (His,[33] Gudzent,[3 34 211] Loewenthal[35 244]). The results

reported showed that hygienic and dietetic measures could not be substituted by the emanation treatment; also that weak doses did not always produce a remarkable change in the morbid manifestations. There are only a few instances in which weak doses, i.e., 4-8 Mache units to the liter of air, produced topical reactions on supposedly very susceptible individuals with subacute rheumatism and tabetic pains. As a rule, however, the air should not contain less than 25 Mache units to the liter. Even higher doses can be given, but should, however, not exceed 500 Mache units. For experimental purposes higher concentrations up to 1200 Mache units have been used (Falta,[29] Knafll, Lenz,[27] Von Noorden and Falta,[30] who experimented with 40,000 Mache units, a dose which produced marked pathological changes).

It is most important that the physician prescribing radium inhalation should be well informed about the strength of emanation given, so the following classification could be adopted:

(1) Weak emanatories, in which 8-12 Mache units are contained in a liter of air.

(2) Medium strong emanatories, in which 12-25 Mache units are contained in a liter of air.

(3) Strong emanatories, in which 25 Mache units and more are contained per liter of air.

All emanatories containing less than 8 Mache units should be closed, as their weak action can only discredit the method, as such institutions may become a means of exploitation of the believing public. The expensiveness of such emanatories, by which only a small amount of emanation can be introduced, and the short duration of the emanation in the body, it being shortly eliminated through the lungs as soon as the patient leaves the institution, render such a treatment very expensive. The total amount of the so-called active precipitate, once in the body, is rapidly changed into the inactive radium D. The objections to emanatories are the long stay of the patients in badly-ventilated chambers, which, of necessity, cannot be healthy; also the possibility of the bacteria present infecting the patients (Lazarus[31]). Certain natural baths and gases which are radioactive (Franzensbad, Neumadowiczs[39]) also give good results. In order to avoid the expense of the emanatory, smaller apparatus ("activators"), allowing of bedside use, have been constructed (Bulling,[36] Lazarus,[31] Saubermann,[34] Bickel,[41] Engelmann,[42] Sommer,[43] Ashoff,[44] Loewenthal[45]). These applications have doubtless a future, as the dosage of emanation can be regulated to the strength required for each case in question. Therapeutically, favorable results have been reported with the use of emanatories (Kionka,[14] His,[46] Gudzent,[24] Lachmann,[48] Fürstenberg,[47] v. Jacksch,[48] etc., Neumanowicz,[49] Mannes and Wellmann[167]).

A third way of emanation treatment is recommended in the form of drinking radioactive waters (Eichholz,[51] Engelmann,[42] Armstrong,[50] Kemen,[52] Schmeking,[53] Messernitzki,[54] Mache and

Suess,[54] Nagelschmidt,[55] Lazarus,[56] Benczur,[57] Kionka,[13] Spartz, etc., Fleischmann,[58] Strassburger,[59] Davidsohn,[61] Gudzent[211]).

Experiments have shown that radioactive solutions and substances in the gastrointestinal tract give off their different rays, which pass through the walls and are absorbed directly into the blood and so can act upon the different digestive glands, the body cells and ferments. The relatively slow progress of the intestinal content allows a gradual absorption, which effect is particularly desirable in the cases of abnormal processes in the liver, etc. A gradual accumulation of emanation within the body is generally admitted, but to what extent this is possible opinion still differs (Gudzent,[60 211] His,[4 33] Kemen,[22] Lazarus,[19 56] Dominici[94]).

In morbid manifestations of the gastrointestinal tract the sipping cure of Lazarus[19] has given good results, as in irritation of the stomach, hiccough, vomitus matutinus and hyperemesis. Small and repeated doses during the day seem to have a more general effect than if the emanation is given in one daily dose of 1000-2000 M. U. This, of course, means a small amount, as the emanation is rapidly eliminated by the body, although certain authors claim a good result even with weak but constant doses of emanation (Benedict). Some authors (Falta, etc.) have employed 20,000-60,000 M. U., and they attribute their good results to the higher dosage, provided that the patient can meet such expensive treatment.

A great number of radioactive preparations within the last few years have been put on the market, substances which have been activated from the deposits in the mud of radioactive springs (radiogen, emanosol, radiol, etc.) as baths (Löwenthal,[244] Laqueur[257]), cushions, compresses, etc., impregnated with radioactive substances (Lazarus,[19 56] Fr. Scholz,[27] Kemen,[22] Schuecking,[52] Aschhoff,[44] Benczur,[57] Friedrich,[66] Strassburger, Eichholz,[180] Strasser,[200] Braunstein,[258] Schweitzer,[205] Sommer,[247 249] Darier,[252] London,[253]). Good results with these compresses and other appliances have been recorded by various authors in disease, as subacute and chronic rheumatism, arthritis, neuralgias, etc. The effect is ascribed to the different emanating rays, although the quantity of emanation available to act upon the skin and the subjacent tissues cannot be considerable. The main process, however, is based upon the diffusion of gases. It can be easily concluded that only a very small amount of emanation enters the body. More powerful cushions and compresses are exceedingly expensive, but may give more favorable results. They are indicated in cases of monarticular and chronic rheumatism, in the painful relics of chronic rheumatic arthritis, during the painful relapses and manifestations observed in the Heberden nodes and in neuralgias of the fifth nerve.

The small bags containing metallic radium (Buxbaum[62]) or its salts may be restricted to the radiotreatment in dermatology and surgery. It may be briefly mentioned that the mud of Zirconium,

containing thorium and used for radioactive compresses, seems to give good results (Gudzent[4])

2. Subcutaneous Use of Radium Salts.

Emanation injected subcutaneously has been reported to in exceptional cases; its effect is too evanescent for practical purposes. The injection of radium salts (bromide or chloride of radium) in weak solutions, one of the oldest means of application, is more important. The slow elimination of the radium through the body provides a more continuous emanation and the production of electric energy. This action can be maintained by successive injections of the radium solutions given in doses of 1 c.c. If these ampouls contain 1000 M. U., they would be equivalent to 0.000003 gr. of radium. According to several investigators, it seems doubtful that any therapeutic effect is had with such minimal doses. In order to obtain a local reaction in particular, a dose must be given many times higher than that first mentioned for chronic rheumatic disturbances. In such instances the solution has to be injected in the tissues adjacent to the diseased joints (Gudzent, Nahmmacher[106]). To produce general reactions, as that desired for a reaction of the red and white blood cells, 20-30,000 M. U. are required (Falta,[50] Brill,[63] Freund,[71] Kriser,[91] Zehner[65]). In experiments on animals, 0.00001-0.00002 gr. of radium for every 1 kilo. body weight was required for every dose, producing no undesirable consequences. For a patient of 155 pounds body weight, 1/180-1/120 gr. or radium would be required. This question, still in the phase of experimental study, cannot be conclusively discussed at the present time. It would seem, however, that the doses formerly used were too small.

At this instance it may be well to mention the pathological changes which were produced in cases where overdoses of emanation were given. Messernitzki[68] directed the attention upon pathological destructive changes in the skin after handling radioactive substances (ulceration and dermatitis). Obersteiner, Loewenthal[67] mention experiments upon mice where marked changes in the ganglionar cells of the brain were encountered. A similar fact has been reported by v. Knafll Lenz,[37] who experimented with large doses of emanation (40,000-4000 M. U. per liter air) on rats. His findings were: General hyperemia of all the organs, especially the lungs; degenerative changes of the nervous elements of the brain (shrinking of the ganglionar cells, disintegration of the nigroid bodies, formation of vacuoles, homogeneous aspects of the ganglionar cells).

If we will avoid undesirable results with high doses of radio-emanation, we should remember the fact that we may damage the vitality of the cells to such an extent that they are destroyed and become necrotic (Lazarus,[38] v. Noorden,[69] Prado Taglo[15]); so individualization and discrimination becomes necessary. It is best to increase the dose gradually from 100 M. U. upward, and best

after meals if the intestinal tract is chosen from which the energy is to be spread throughout the body (Messernitzki[57 58]).

As a further improvement, it should be required that the usual strength indicated on the ampouls, 1000 M. U., should be replaced by the statement how much metallic radium is contained in the given solutions, and it would even be desirable that this supervision should be carried out by the State. From all the literature, it would seem that radium treatment by means of injections has a great future, but it is yet too early to recommend it for general use or to stamp this method as a specialty (v. Noorden[69]).

(B.) THORIUM.

In the series of elements which belong to the thorium group, there is also found a gas called thorium emanation (Rutherford, Soddy[1]), which is of so short a duration that it cannot be used for medical purposes (Bickel,[70] Emsmann[71]); nor can it be inhaled. Among the substances that arise during the process of decomposition, mesothorium, radiothorium and thorium X have been used, principally in form of injections or in the form of radioactive solutions. The rapid disintegration of these products makes it very difficult to obtain a pure substance free of undesirable impurities. Radiothorium is represented by a solid body which decomposes very slowly. According to some authors (v. Noorden[69]) this product is considered as almost indifferent therapeutically, whilst others (Keetmann,[72] M. Meyer, Sticker[214]) attribute to it great energy.

Medicinally, most attention has been concentrated upon thorium X. This is a solid body, half value 87.5 hours, belongs chemically to the earth alkalies, is easily soluble and forms salts which dissolve freely, for being used in solutions, given by mouth or in subcutaneous or intravenous injections. This compound is very rich in rays (mostly alpha rays, less beta rays). The elements of decomposition disintegrate very quickly. The elimination of thorium compounds through the body is very slow, so that the greater part of the injected material in the body can give off electrical energy. About 28 per cent. of the material introduced into the body is eliminated, chiefly by the digestive tract, to a small extent by the kidneys, lungs and the skin (Plesch and Karczag[12]). There is generally admitted a certain affinity of the different body cells for thorium, bone marrow, lymph glands, spleen, liver, brain, etc. (Karczag and Plesch). The molecule of thorium X within the body undergoes at least five different electrical explosions, which give off new electrical energy, and so warrant an extensive utilization within the body. It is evident that this extensive utilization of each decomposing thorium X molecule and the possibility of an accurate dosage mean a serious competitor to radium emanation, as the latter allows only an unreliable dosage, which renders the control exceedingly difficult. According to the present understanding of the elements which belong to the radium and thorium series, the biochemical effects seem to differ only quantitatively.

It cannot be denied that greatly varying differences in the preparations used will be met with—differences which will of course influence the intensity of the effects and of the results obtained, and still more investigations along these lines are indicated. Solutions of thorium X, partly given by mouth, subcutaneously or intravenously, or in the form of drinking water, have been used in many instances (Emanuel,[71] Loebe,[72] Minaud,[73] Kopp,[74] Pralo Taglo,[75] Keetmann,[76] Gudzent,[77] Plesch and Kerting,[78] Falta,[79] Minkowski,[80] Bickel,[81] Iswolsky,[82] Klemperer,[83] Hirschfeld,[84] Zinn,[85] Kriesel,[86] Nagelschmidt,[87] Domarus[88] W. Salle,[89] Wagner[90]).

The best method has yet to be ascertained by further investigations. Contrary to a former view, it is generally admitted that injections subcutaneously are well born without signs of opposition. Insoluble thorium preparations when injected under the skin, however, engender an inflammatory process, hyperemia, caryolysis, necrosis, increase of fibroblasts, and finally proliferation of connective tissue and the formation of scar tissue (Pralo Taglo[75]). With toxic doses intense morphological changes have been observed (Orth,[91] Gudzent,[77] Bickel,[81] Plesch,[78] Hirschfelder and Meidner,[92] Pappenheim and Plesch,[78] Loebe,[72] Salle and Domarus[88][89][90]). Among the post-mortem findings, necrotic changes in the gastrointestinal tract, liver, kidney, with cloudy swelling, marked destruction of the pulp of the spleen, atrophy of that organ, disparation of the adenoid tissue, marked degeneration of the suprarenals, hemorrhagic diathesis, disintegration of the bone marrow, hemorrhages in the lungs, liver and kidneys, have to be mentioned. However, if, owing to the lack of experience, it happened that the emanent powers and energies of thorium preparations have been underestimated, greater precautions have been taken in order to avoid undesirable and fatal results. Thorium, like all other poisons, means a double-edged knife, which can be used only in proper doses. The entire thorium treatment is still in its experimental stage, and also an individual susceptibility for that remedy has to be considered (Gudzent, Plesch,[78] Sticker[93]). It must be remembered that large doses, frequently repeated, 300,000-500,000 M. U., given by mouth seemed to cause slight digestive disturbances (v. Noorden[94]), anorexia and nausea. Similar symptoms as nausea, dizziness, malaise were observed by Czerny and Caan[95] after the administration of 1-3,000,000 M. U. intravenously. This does not happen with smaller doses from 50,000-100,000 M. U. Although no cardinal difference seems to exist between the intravenous or subcutaneous introduction, the rapidity of elimination must differ in both methods. Medical science will be mostly indebted to the clinics of Krause, His and v. Noorden and others for their research work in thorium therapy, which was started independently of each other about the same time. Probably with our increasing understanding of the qualities of thorium, this method of treatment is likely to gain in importance. This assumption is justified by the possibility of an

accurate dosage, the rapidity of action, the easy form of employment and last, but not least, the relative smaller price of thorium preparations.

BIOLOGICAL THERAPEUTICAL CONSIDERATIONS.

Under this caption we shall briefly review the biological and therapeutical properties of radium and thorium products. As has been seen, the curative value of radium containing minerals thus receive their scientific confirmation. Some authors (Dautwitz[260]) were surprised at hardly seeing any cases of gout, rheumatism or neuralgia among the miners of Joachimsthal, although their work offered them plenty of opportunities for being exposed to humidity, cold, drafts and exposure of various kinds. Again, long before anything was known of the existence of radium and the radioactive qualities of pitchblende, people of Joachimsthal used pitchblende enclosed in little bags of leather for relief from headache and neuralgias of all kinds with excellent results (Havorka and Kronfeld[256]). The reputation of certain mineral waters, which chemically were found very poor, was revealed later by their high radioactivity, which should remind us that often empirism and good observation power of our ancestors preceeded our scientific knowledge for years, even for centuries, and that it is not well to make light of a knowledge which lacked the advantages of our present laboratory and scientific devices.

Action Upon Growing Cells.

Radium emanation in small doses exerts a stimulating influence upon growing plants (Winkler,[96] Fulton and Schwarz[174]), whilst stronger doses check the growth of vegetable and animal cells, eggs and embryos (Winkler, Molisch,[97] Bauer,[98] Hertwig,[99 238] Halban,[198] Hertwig, P.,[223] Kahn, Fr.,[233] Hertwig, G.,[239] Sommer[247]). This is also true of thorium X acting upon seeds (Bickel and King[100]). Radium emanation acting upon the ovaries and the uterus of rabbits increases the function of these organs (Fellner and Neumann[191]).

Action Upon Micro-organisms.

The alpha rays from radium have a checking influence upon certain micro-organism (Chambers and Russ,[165] Omelianski,[177] Pfeiffer and Friedberger[186]), *i. e.*, gonococci (Fabre[102]). For most pathogenic organism, however, as coli, typhoid bacilli (Iredell and Minett[197]), tubercle bacilli (Becquerel,[222] Wolff,[103] Caspari,[104] Brieger,[105] Orszag,[106] Frouin[236]), bacillus prodigiosus (Caspari[104]), such a bactericid influence must be doubted (Lazarus,[19 38 56] Loewenthal[67]). If such an influence can be admitted (c. v. Klecki[108]), it must be due to a stimulating influence of emanation upon the phagocytic power of the white blood cells. Thorium, also, has no bactericid power upon coli bacilli (Plesch and Karczag[12]). Radioactive substances have been used successfully in cases of acute and chronic suppurations (Schücking[52]), conjunctivitis, phlegmons, ulcer of the leg (Friedrich,[66] Neu-

nanowitz,[9] Plagemann[109]), chronic bronchitis (muth) also indicated by Bulling.[45] In tuberculosis, notwithstanding the favorable reports from Bernheim[17] with dionaform in tubercular peritonitis (Neusser[81]), Thor. nitrate vapors in pulmonary tuberculosis (Gordon Shapp[58]), those of Solly[94] in tubercular larynx, several authors (Brieger,[36] Orszag,[86] Fleckseder[51] and others) recommend the greatest care in resorting to such treatment. (See contraindications.)

Action Upon Ferments.

Radioactive substances, especially radioemanation in weak doses, exert a stimulating influence upon the action of pepsin, of the pancreatic ferments, upon the fermentation of lactic acid (Braunstein and Bergell,[111] Bergell and Bickel,[112] Richet,[90] Loewenthal[57]). In larger doses emanation as well as radium salts check the pepsin action (Ravenna[114]). Pure radium preparations, containing no decomposition products (Bickel,[115] Th. R. Brown[116]), have no activating influence upon the ferments. Diastatic and autolytic ferments become activated by radioemanation (Loewenthal[57]). The same effects can be observed with thorium emanation, particularly the alpha rays (Bickel and Minami[74]).

Action Upon the Caloric Metabolism.

Inhalation of radioemanation is followed by a rise in body temperature for the first hour, whilst afterwards a drop of the body heat can be noticed. The same drop is observed after the administration of radioactive solutions by mouth (Darms[117]). Emanation introduced into the body increases in many instances the respiratory gas metabolism (Kikkoyi,[118] Bernstein,[119] Silbergleit,[120] J. v. Benczur and D. Fuchs[209]). Persons remaining in the emanatorium for two hours daily in an atmosphere averaging 110-440 M. U. per liter presented an increased output of about 27 per cent. Such a result would only be obtained in persons treated with thyroid gland. It is generally admitted that weak doses of emanation, as 2 M. U. per liter air, have no effect whatsoever (Loewy,[121] Plesch[122]). As according to some writers (His,[43] Kaplan,[208] etc.) fat and nitrogen metabolism are increased by radioemanation, such a treatment would be indicated in cases of endogenous adiposity (v. Noorden and Falta[89]). Probably thorium treatment would be better on account of the longer lasting effect of emanation within the body (Plesch[122]). Such a treatment would, therefore, be contraindicated in cases of severe diabetes, in Graves' disease and in febrile conditions, where we have already an undesirable increase in metabolism.

Action Upon Metabolism of Proteids.

In most of the cases examined an increase in proteid metabolism was observed. Therefore, radioactive treatment is indicated in gout and in many conditions dependent upon old age.

Metabolism of Carbohydrates.

The respiratory quotient during emanation may show a considerable increase (Stähelin and Masse,[204] v. Noorden), so there must exist a greater mobilization and ozygenation of carbohydrates. Lepine[122] (Wohlgemut and Engelmann[171]) also explains this effect by an activation of a glycolytic ferment. In a few instances Reicher[123] noticed a diminution of the blood-sugar. Such facts, however, do not give an indication for the use of radioactivity in all cases of diabetes mellitus. In the latter disease the therapeutic aim must be to reduce the production of sugar; a demand for a higher oxygenation does not exist. Although several instances of the favorable influence of the inhalation and the drinking of radioactive solutions are found in the literature (His,[125] Armstrong,[50] Loewenthal,[124] Gudzent,[211] Fränkel[213]), little or no benefit has been recorded (Reicher,[123] Umber,[126] Poulsson,[127] v. Noorden and Falta[189]), and even cases are on record where radioactive treatment can favor an increase in the production of sugar as well as that of acetone, which fact is explained by an impoverishment of the liver in glycogen. Experiments with thorium X (Plesch[12]) have shown an increase in the decomposition of cane sugar, whilst mono and disaccharides remained unaltered. So far as known, thorium has not yet been used in the treatment of diabetes.

Metabolism of the Purinbodies.

The action of radioactive substances upon uric acid and the oxypurins have already been mentioned (page 108). Although the opinions advanced upon that subject are not yet uniform, different authors (His,[4] Messernitzki,[5] Kemen[22]) maintain that with radioactive treatment a considerable increase in the output of uric acid can be observed (Kaplan[203]). In certain cases treated with high doses of radioemanation the difference may be as high as 100 per cent. According to recent investigations, it would seem that radioemanation stimulates the uricogenic ferment, whilst no particular action would be observed with regard to the antiuricogenic ferment (Schulz[227]). Experiments upon animals (Engelmann,[128] Toffanow[169]) have shown that subcutaneous depots of uric acid undergo rapid resorption if radioactive water is given, whilst in control no change is observed whatsoever. In the blood a diminution, and even a disparition, of the uric acid in the blood could be observed (Klemperer[129]). This does not take place in all instances, as negative results have been recorded (Brasch[130]). We must not forget the technical difficulties of a reliable quantitative determination of uric acid in the blood (Lazarus[38 56]). Even clinically, gout may be improved during radioactive treatment, and still there may be found no change in the amount of uric acid in the blood (Mandel,[131] Lazarus,[38 56] Brasch[130]). The question remains still undecided whether uric acid in the blood means only a pathognomonic sign for gout (Krehl[132]), and whether the disparition of that substance, which

may occur under an exclusive dietetic treatment, can be identified with a cure of gout or not.

Radioactive substances may either favor a better elimination of uric acid, or they may increase the production of uric acid. The latter possibility, the change in the metabolism of purin substances, may be due to the direct influence of radioactivity upon ferments (uricolytic ferment from Lepine, His and Umber). It seems certain that these changes are in relation with the considerable action of radioemanation upon the leucocytes, as will be seen later. His[4] and Umber,[5] later on Armstrong,[6] Burnham,[12] Lowe,[13] were very much in favor of radioactive treatment in gout; this on account of the clinical improvement, the increased elimination of uric acid, the disparition of tophi observed in cases of gout. The question whether any accumulation of emanation in the blood serum takes place (see below) is still under discussion. Some authors (Kraus,[14] Cohn[15]) do not ascribe to radioactive substances any specific influence upon metabolism of gouty patients.

Thorium X also exerts a powerful action upon the molecule of uric acid (Falta). There is a considerable increase in the output of uric acid (from 0.17 gr. to 0.8 gr. a day). The elimination of the endogenous purinbodies also is increased (Plesch[16]). This period of increased output of uric acid is followed by a striking period of reduction, and it can be explained by the more far-reaching destruction of thorium X upon the molecule of uric acid (Falta[16]). Based upon these facts, the radioactive treatment in cases of gout was justified (Neusser,[17] Gottheb,[20] His,[4] Strassburger,[21] Harret,[24] Jansen,[25] Sommer,[26] Fuerstenberg,[27] Ashoff,[28] Bulling,[29] Kemen,[30] Scholz,[31] Goldberg,[32] Mannes and Wellmann,[33] Weisz,[34] Georges,[35] Messernitzki,[37] Umber,[38] Laqueur,[39] Loewenthal[44]). As in these experiments the old rules of dietetics were still maintained, the decision becomes difficult as to what percentage of the success can be attributed to the radioactive treatment itself. A certain reserve is still indicated, the more as weak emanatories have certainly been overestimated in their effect upon gouty patients. Strict diet is still an important factor, just as before. Van Noorden's diet for gout and the possibility of purin-free diet, which gradually increases the tolerance for purin bodies (Lazarus,[45,46] Brugsch[47]). In the administration of radioactive treatment, the drinking of radioactive solutions seems much recommended (Lazarus[45,46]). Some authors (Baechhold and Ziegler[48]) recommend even a continuous use of radioactive substances, in order to keep the body under continuous action of radioemanation. Good effects are to be observed in cases of atypical chronic gout, in which the pains and diffuse swellings are relieved. The opinions regarding the favorable effects of weak or strong emanation upon tophi in a quiescent stage still differ. In rheumatism, as in neuralgias and myalgias, the increase of pains and the more pronounced swellings prognosticate a good therapeutic result. Acute attacks of gout are

not much influenced by radioactive treatment. Given at the time of the attacks, these are more aggravated in comparison with former manifestations. The experiments, which prove a more favorable action of thorium X upon the gouty process, must be followed with interest. This in particular on the tophi of the ear, according to observations collected from Falta.[36 221] It is well to remember that thorium X treatment may produce the onset of an attack of gout (Gudzent[3]). In gouty kidney and in cases with tendency to nephrolithiasis, the radioactive treatment requires great caution on account of the large amount of uric acid with which the kidneys are flooded after this treatment. This may even form a contraindication. At any rate, large doses of alkali must be given at the same time, as radioemanation has a tendency to increase the acidity of the urine. Whether the observed hematurias have any connection with the treatment given has to be decided by further investigations. The blood analyses made with reference to the amount of uric acid are doubtless of great scientific interest. More recent indications make it advisable not to consider the amount of uric acid found in the blood as an indicator for the welfare or the danger of the gouty patient. With manifest symptoms of gout present, the amount of uric acid may not be found higher than in normal conditions, and vice versa. It seems that the analysis of uric acid in the blood has more a diagnostic value. For instance, in a case where the kidneys are normal, a diet rich in purin bodies, the blood is found about normal with regard to the amount of uric acid. This test for the presence or absence of gout is certainly valuable. This determination becomes important in cases of gouty myalgias and neuralgias, which for a long time precede the characteristic attack. It is evident that a positive result of the blood analysis is more valuable in cases that for a longer period have been kept on a purin-free diet.

Influence Upon the Blood.

The opinion of Gudzent[34] and Marckwald,[139] that radioemanation is stored up and retained for a long time in the blood, is still under discussion. The experimental results, however, show that after inhalation the emanation is rapidly eliminated through the lungs (Fleischmann,[17] Kemen,[22 136] Kionka,[13] Lazarus,[38 56 199]). Emanation given by mouth seems to remain for a few hours within the body, and is therefore more effective (Fleischmann,[17] Kemen,[22 136] Pieper,[140] Kionka[13]). Inhaled by baths, within the first hour a moderate accumulation can be expected (Kemen[22 136]). Large doses of radioemanation (injected and by mouth) increase the coagulability of the blood, which is probably due to the increase of ferments (Von den Velden[141 240]). Thorium X, however, lessens the coagulability of the blood and favors hemorrhages (Domarus and Salle[87]). Upon the red blood cells of normal human beings and animals great quantities of emanation, medium doses of radium salts injected subcutaneously or persons who

handle a great deal of radium salts and radioactive solutions have a decided influence. A similar effect can be obtained by induced radioactivity (Farnau, etc.[225]). According to the dose given hyperglobulia, which may last for several months, is the result. Evidently the radioactive substances exert a very stimulating effect upon the hemopoetic organs. Small doses have a stimulating, high doses exert a destructive, action upon the red blood cells, so that the formation of new blood may be checked, and even a destruction of the hemoglobin may result (Giacchi,[224] C. Noeberg and Karezag[227]). As demonstrated by Knafl Lenz,[228] high doses of emanation cause hemolysis in guinea pigs' blood. Similar effects are obtained with thorium X, the more if we remember that in the bone marrow this substance is accumulating (Klemperer,[82] Prado Taglo,[1] Plesch,[12] Hirschfeld and Meidner[13]). These facts must always be borne in mind when radioactive treatment is applied, as it is most dangerous in cases where the hemopoetic function of the bone marrow has already much suffered in advanced stages of disease. It is contraindicated in Banti's disease and far-advanced cases of pernicious, secondary and cachectic (carcinomatous) anemias. Although favorable results have been reported in pernicious anemias by radio and thorium treatment (Gudzent,[230] Plesch,[12] Bickel[113, 229]), the later results (Klemperer[82] and Hirschfeld,[85, 224] Minkowski[73]) emphasize that great precautions must be observed with such a treatment, particularly in far-advanced cases. In anemias of children, with splenomegaly, thorium X treatment may increase the red blood cells (Plesch[12]). Radioactive solutions given by mouth seem to be less dangerous and more effective (Bickel[113, 229]). If in pernicious anemias a favorable result with radioactive treatment can be observed, we must not forget that by the ordinary methods of treatment favorable and spontaneous turns can be observed (blood crises). Radioactive and thorium X treatment are still methods of experimental studies, but merit our attention. A final conclusion with regard to its definite value cannot yet be advanced. The injections with radium salts still present a safer, although more expensive, method of treatment, owing to a selective influence upon the erythroplastic system in doses without harmful effect upon the red as well as upon the white blood cells. However, it seems that large doses, probably 1 to 10 mgr. or more, are required, a factor which needs consideration.

The white blood cells are equally susceptible to radioactive substances. Small and medium doses of emanation also induced radioactivity (Farnau[225]), have a slight or no effect upon the total number of white cells. Frequently an increase of the eosinophiles is noticed (Gudzent,[230] Miss Levy[144]). Whether asthma, in which condition a hypereosinophilia is encountered, can be favorably influenced by radioactive treatment remains still doubtful (v. Noorden[86]). Only in one instance, in v. Noorden's clinic, where such a condition combined with a chronic inflammation of the knee existed, was a favorable result noticed. Large doses of radium and

thorium X cause a decided leucocytosis, which stage is followed by a marked leucopenia, so that even no leucocytes may be found in the circulating blood (Gudzent,[78] Falta,[36] Engelmann,[145] Pappenheim and Plesch,[92] Klemperer[82]). Quantitatively, the polymorphonuclears are increased, the lymphocytes are diminished. Whilst monocytes, eosinophiles, mastcells, special leucocytes, lmyphocytes have already disappeared, the leucocytes are less vulnerable (Pappenheim and Plesch[92]). Animal experiments and postmortem findings after overdoses of thorium X had been given can be summarized as follows (especially with thorium X): Necrotic changes in the gastrointestinal tract, liver, kidneys with cloudy swelling, marked destruction of the pulp of the spleen, atrophy of that organ, disparition of the adenoid tissue, marked degeneration of the suprarenals and of the chromophil system, hemorrhagic disintegration of the bone marrow, hemorrhages in the lungs, liver and kidneys.

Notwithstanding the unappropriate dosage of thorium X, this substance has been used in cases of leukemia, so far as seen from the early reports, with favorable results (Falta and Freund,[36] Plesch,[12] Gudzent[60]). We have to consider whether a stimulating or destructive action of thorium X is desired. In certain cases, however, of leukemia, in relapses thorium X has only a temporary effect, so that the other methods of treatment cannot be discarded (Klemperer,[82] Hirschfeld,[83 224] Minkowski,[79] Nagelschmidt,[86] Plesch,[12] van Noorden, Türck[235]). Just as in far-advanced cases of anemia, also in far-advanced cases of leukemia, thorium X treatment cannot be used. If thorium X and radioactive substances cause a destruction of the white blood cells, and if there is noticed an increased output of uric acid in the urine, perhaps this fact may be due to an overproduction of uric acid resulting from the destroyed white blood cells. The possible freeing of ferments from the leucocytes may also entertain a more active metabolism in gouty patients. If in certain experiments (Klecki[146]) pathogenic bacteria are more easily rendered inactive by phagocytosis, radioactive treatment may have its value in favoring a leucocytosis and phagocytosis.

Radio and thorium treatment have been extensively used in swellings and tumors of the lymphatic glands, but as the discussion of these results does not belong to internal medicine, the mentioning of such possibilities will be sufficient.

[NOTE.—A complete list of the references to this article will be published in the June issue, when the article is completed.]

(*To be concluded.*)

Book Reviews.

INTERNATIONAL CLINICS. Edited by Henry W. Cattell, A.M., M.D., Philadelphia. Volume III. Twenty-third Series. Cloth, $2 net. Philadelphia and London: J. B. Lippincott Company. 1913.

Volume III, twenty-third series of "International Clinics," contains a number of articles well worth spending some time with. The article on "The Prophylaxis and Treatment of Malarial Infections," by Charles F. Craig, Captain, Medical Corps, United States Army, shows a firm grasp of the subject. Captain Craig is an authority on tropical medicine, and especially malarial diseases; therefore, an article from his pen cannot be otherwise than authoritative. We were especially impressed with his statement—though everybody recognizes the vital importance of preventing malarial fever—that in many sections of the United States but little has been accomplished in the prophylaxis of these fevers. He even declares that many localities in our southernmost States are practically uninhabitable by reason of the severity of the malarial infection there present, while in others the inhabitants lead a wretched existence, made miserable by frequent and repeated attacks of malarial fever. We were still further shocked by the declaration that within recent years much money and labor have been expended in an effort to eradicate the hookworm, but very little has been accomplished or undertaken in the eradication of malarial disease, of vastly greater importance, in his opinion, than hookworm infection. The article then outlines a scientific plan by which miasmatic infection can be absolutely controlled; then discusses in turn the prophylactic use of quinine, proper treatment of the carriers of the infection and of initial infections, education of the public and the treatment of malarial infection. Though malaria is not as prevalent in Maryland as formerly, still it occurs sufficiently often for the physicians of our State to keep themselves abreast of the latest information in matters malarial. Another article which should receive some attention is "Remarks On a Clinical Study of Uncinariasis and Its Treatment," by Bailey K. Ashford of the United States Army Medical Corps, who did so much to bring hookworm under control in Porto Rico. Besides these, there are a number of other articles which no doubt will prove not only interesting, but instructive to the general practitioner.

INTERNATIONAL CLINICS. Edited by Henry W. Cattell, A.M., M.D., Philadelphia. Volume IV. Twenty-third Series. Philadelphia: J. B. Lippincott Company. Cloth, $2 net. 1913.

The present volume of the above popular series should meet the demands of the most fastidious connoisseur. Here is to be found a collection of articles in medicine, surgery and the specialties that

are of a most advanced character. Perhaps the most entertaining and instructive as well as interest-provoking article is that of F. Proescher of Pittsburgh, Pa., entitled "Azurophile Micro-Organisms," or etiological studies on rabies, poliomyelitis, and variola. For many years a host of investigators have been endeavoring to discover the etiological factors in these diseases, and sporadically one will be informed that the causative agent has been discovered. So, here again the announcement has gone forth that by certain methods which the author has fully described the ultra-organisms producing these maladies have been discovered. The author summarizes as follows: My tinctorial studies of the etiology of smallpox, poliomyelitis and rabies have demonstrated that these micro-organisms, which are more or less filterable and classified as ultra-microscopical or invisible viruses, can be made visible with certain dyes belonging to one and the same group of aniline dyes, and that filterability should not be confounded with microscopical invisibility. The term ultramicroscopical or invisible virus should be discarded. We have seen that the actual pore size of porous filters of whatever make is about 0.2 micron. The smallest forms of rabies, poliomyelitis, and smallpox virus are less than 0.2 micron in length. The poliomyelitis virus is the easiest to filter. It passes through the Berkefeld, Chamberland, and Pukal filters with the same ease, while the rabies and variola virus will pass only the Berkefeld filter V, and then only by thorough emulsification of the material. The filtration of the latter two viruses could not be confirmed by any investigators, in spite of using the same filter and technic.

The cause of many failures in filtration cannot be definitely ascertained, but it seems that not the filter alone nor the intracellular location of the virus is responsible. The chief reason seems to be that the peculiar structure of the micro-organisms, not their size, allows them to pass through the pores of the filter. The invisibility of these micro-organisms while alive must be due to high light refraction. For instance, in spite of the infectiousness of the otherwise sterile contents of variola pustules, no micro-organisms can be seen with our ordinary microscopes and highest magnification and slant illumination.

The content of the variola pustule is most favorable for direct observation on account of the small amount of its cellular detritus, which allows us, per analogian, to conclude that other filterable viruses in a living condition are also highly refractible and invisible with our common methods. The cellular detritus in the virus of rabies and poliomyelitis hinders the direct observation of the micro-organisms.

Filterable viruses are distinguished from other micro-organisms by the formation of more or less specific cellular inclusion products. These inclusions, which have a peculiar location in each disease and more or less specific staining properties, were once considered to be a certain developing stage of the virus, but are

now regarded as cellular reaction products formed by the virus from the cellular contents. No other known micro-organisms produce such cellular reaction products, even by parasitism in lower vertebrates.

Prowazek designated the filterable viruses as chlamydozoa, which means micro-organisms which lead to the formation of peculiar reaction products in which they are isolated and included.

According to Prowazek, the chlamydozoa are more nearly related to protozoa than to bacteria. They are cell parasites, the cells responding to the invasion of the virus by a production of characteristic reaction products which, as a rule, have an affinity for nuclein stains.

The cellular reaction products found in hydrophobia are probably derived from the nuclei. The reaction products are located in the cotoderm, in the epithelial cells in vaccine, scarlatina, in the nerve cells in rabies.

In spite of their constancy, these reaction products cannot be the causative agents in these diseases. These inclusions are called Guarnieri bodies in vaccine and variola, Negri bodies in rabies. After the destruction of the Guarnieri bodies in vaccine with 20 per cent. sodium hydroxide, a positive inoculation can be made. The appearance and structure of these bodies speak against their protozoic nature. They have no protoplasm structure. They are hyaline, and the changes which are interpreted as developing cyclus are only degenerative processes.

My investigation has confirmed Prowazek's prediction that the viruses which form intracellular inclusions must be intracellularly located.

Certain conclusions may be drawn from the staining properties of these micro-organisms as to the chemical composition of the protoplasmic substances. The facts that the thiazine dyes are soluble in neutral fats and higher fatty acids, that the micro-organisms are stained either metachromatic or the same color as the polymerized base, that they are only stainable with the watery solution of the free base which must be anchored by a lipoid substance in which the polymerized base is only stable, suggests that the protoplasmic substance must be a peculiar lipoid protein. The chemical nature of this lipoid substance cannot be determined until we have a pure culture of these micro-organisms. But the lipoid nature satisfactorily explains the peculiarities of these viruses. The lipoid substance lessens the cohesion and gives a greater plasticity, which allows the micro-organism to conform to the pores of the filters. It explains their invisibility in a fresh condition, the lipoid substance having high light-refracting properties. It explains their resistance to drying and freezing, and the preservation of the virulence by the action of glycerine. They may be designated azurophile micro-organisms because of their peculiar staining properties.

Whether the findings of Proescher be confirmed or disproven,

he has done good work and his article should stimulate other workers in the same line to renewed activity in penetrating the mysteries of these diseases.

Essentials of Prescription Writing. By Cary Eggleston, M. D., Instructor in Pharmocology, Cornell University Medical College, New York City. Philadelphia and London: W. B. Saunders Company. Baltimore: The Medical Standard Book Company. 1913.

This little volume will be found of much service by students and nurses in learning the elements of prescription writing. Though small, it meets all requirements for student purposes. It is a guide which if followed will enable the student to grasp in the least possible time the elements of proper prescription writing, an art which is fast dying.

The Principles of Pathologic Histology. By Frank B. Mallory, M.D., Associate Professor of Pathology, Harvard Medical School; Pathologist to the Boston City Hospital. With 497 figures, containing 683 illustrations, 124 in colors, and all but two original, printed directly in the text. Philadelphia and London: W. B. Saunders Company. Baltimore: The Medical Standard Book Co. Cloth, $5.50 net. 1914.

Dr. Mallory believes that pathology can only be appreciated by students when they have mastered a thorough conception of the picture they are studying as an end product by being capable of mentally picturing the lesson in its various stages of development. He is convinced that students should be able to mentally trace backward or forward the probable steps of the specimen they are studying. He has, therefore, made a book on pathology from the morphologic standpoint, constantly bearing in mind the biologic side of the subject, first by ascertaining so far as possible the cellular elements out of which the various lesions are built up, and then by tracing the development of the lesions from the simplest to the most complex. In other words, he is satisfied that it is necessary in order to understand an end result, such as sclerosis of an organ or tissue, to study all of the acute lesions which may terminate in sclerosis. The author opens with a thorough discussion of inflammation in its various phases and the several forms of degeneration. He then passes on to the special injurious agents and the lesions they produce, namely, staphylococcus, pyogenes aureus, etc., giving a graphic account of the micro-organism, toxin, injury produced, reaction termination of lesion, special forms of lesion, such as furuncle, carbuncle, osteomylitis and septicemia. Next, he turns his attention to tumors, of which he states we know a great deal about the gross and microscopic appearance of tumors and in regard to their classifications, but nothing in regard to their cause and little in regard to their origin. This section of the book, some 160 pages, is delightfully written.

Though condensed, one is thoroughly impressed with its succinctness and directness of style, as well as the meat therein contained. No frills or furbelows are employed, but every sentence made to play its part in unfolding the subject.

Part II of the book is devoted to special pathologic histology, viz., organs of circulation, of respiration, of digestion, and the genito-urinary organs, the blood-making, etc.

The book is bound to impress the thinking with the logicity of its arrangement, the directness and plainness of statement, and the earnestness of the writer, who has handled his subject charmingly. Not only should the work appeal to student, but also general practitioner and teacher.

ANNALS OF SURGERY. Philadelphia: J. B. Lippincott Company. Single issue, 50 cents net.

It gives us great pleasure to especially commend to our readers the December issue of "Annals of Surgery." It is an exceptional issue, devoted almost entirely to anesthesia, the articles being from the pens of the most noted experts in this line in the United States, viz.: Connell, Gwatmey, Honan, Janeway, Cotton, McMechan, etc. As every practising physician finds it necessary to upon occasion use some form of anesthetic, none should be without this issue of the "Annals of Surgery."

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MARYLAND MEDICAL JOURNAL

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BALTIMORE, MAY, 1914

THE MIDWIFE PROBLEM.

DOUBTLESS Maryland is better protected along this line than many of her sister States, nevertheless there is still much room for improvement. Here the midwife before licensure must have been in attendance on at least five labor cases, must have passed an examination before the State Board of Health. She can attend only normal cases and must call a physician for abnormalities. Above all, if the baby be suffering with sore eyes, she must solicit the aid of a physician. Under no circumstances can she apply instruments or engage in abortion. If she violates any of these laws she is liable to a fine of $5 to $10, and for the third offense forfeiture of license. Therefore, the women of Maryland who are compelled through the force of circumstances to resort to midwives are fairly well protected against unfortunate outcomes. Still, one would be idiotic to dream for a minute that Maryland's midwife law is ideal. It is the best that could be gotten at the time. It was a compromise, and the time is fast approaching when the profession will have to attack the problem again in order to better the present law if Maryland is to take her place with other States. The problem is actual, not theoretical, and must be reckoned with. What is the best procedure to take? Broadly speaking, three standpoints are taken in this country. First, the midwife must be abolished. Second, the midwife had best be ignored and left to her own devices. Third, the midwife should be raised to a higher plane by proper State control and education. It is interesting to learn that the authorities of Bellevue Hospital of New York are alive to the necessity for improvement in the education of midwives and have inaugurated a School for Midwives. This seems to be the proper course to follow. The midwife is with us, she is a necessary institution, and as such demands recognition. If she must be tolerated, and no one would be foolhardy enough to say she must not, the medical societies must have laws enacted compelling those who desire to engage in midwifery to undergo a thorough course of instruc-

tion in recognized hospitals. In this manner the standard of those engaging in the practice of midwifery will be elevated and the public will derive better service. In order to spread broadcast this propaganda the Committee for the Prevention of Blindness of New York has caused to be issued a pamphlet comparing the American with the English method of handling the problem, in which it strongly recommends that the most satisfactory way to abolish the more objectionable part of the midwife problem is to recognize the midwife, place her under control and state educational requirements, and to elevate these latter to such a height that only safe and intelligent midwives shall remain in practice. Somewhat similar measures have recently accomplished much for medicine in this country. Witness the fewer medical schools, fewer and better medical men graduated from the schools, and a general uplift along all medical lines. With the uplifting of the midwife in view, Miss Van Blarcom, as executive secretary of the Committee for the Prevention of Blindness, was commissioned by the committee to visit England during the autumn of 1911 to study the working of the English Midwives Act of 1902. The results of her labors are set forth in the above-mentioned pamphlet in a concise withal comprehensive manner. Here we are furnished with a concrete example of how the midwife problem has been successfully solved by another English-speaking country; how the problem is not so difficult of solution as at first sight it would appear, and how this country, with all its vaunted progress, is at least a decade behind England in this matter. So far as the author was able to ascertain, the United States is the only civilized country in the world in which the life and health and future well-being of mothers and infants are not safeguarded so far as possible by statutory requirements for at least the training and licensing of midwives. The author has gone thoroughly into the many phases of the problem, and through her experience with the practical working of the English law is enabled to offer many suggestions for the betterment of ours. The attitude of the medical profession of this country has always been to stand behind any movement which tended to promote the public health. Here is a problem which needs the support of the profession. We issue the appeal that each and every physician get behind the movement of fortifying the midwife law. It is a national problem and concerns each one of us. In order to fully understand the magnitude of the problem we earnestly commend this pamphlet to those interested in solving the problem.

Medical Items.

Dr. J. Charles Macgill, who has been confined to his home at Catonsville with an attack of influenza, is very much improved.

Dr. Thomas W. Koon has been elected Mayor of Cumberland.

The second semester of the Johns Hopkins University began Thursday, April 16.

Dr. Leonard G. Rountree, associate professor of experimental medicine; Dr. E. T. Marshall, associate professor of physiological chemistry of the medical department of Johns Hopkins University; Dr. J. C. Keith of Johns Hopkins Medical School, and Dr. Samuel Amberg, director of Otho S. A. Sprague Memorial Institute Laboratory of the Children's Memorial Hospital of Chicago, spent their Easter vacation at Trinity Cottage, near Springfield, West Virginia.

An active campaign to raise $320,000 to relieve the indebtedness of Mercy Hospital and help make necessary improvements was started recently. Active in the campaign are many men and women widely known in professional business. They have 1000 workers who will strive to collect the amount before May 5.

The position of Secretary to the Board of Health and Health Officer of the City of Cumberland, Allegany county, Maryland, will be vacant after May 1, 1914. Applicants must be trained sanitarians and bacteriologists, devoting their entire time to the office. A good salary is provided. File applications with or write for further information to the Board of Health, Cumberland, Md.

Medical and newspaper men met April 7 to discuss a plan for closer co-operation between the medical profession and the newspapers of the city. An agreement was approved that a definite method of co-operation between the two professions be formed and a central authority established to assist actively the newspapers in getting accurate and educative information before the public.

The Washington County Anti-Tuberculosis Society has leased the Dr. Herman R. Eavey building, where it will maintain permanent quarters, in charge of Miss Nellie Casey, the county health nurse. Clinics are held under direction of a committee appointed by the Washington County Medical Society.

Dr. Winford H. Smith, superintendent of Johns Hopkins Hospital, was the principal speaker at the luncheon of the Women's Civic League, which was held on the fifteenth floor of the Fidelity Building April 25. His subject was "Sydenham Hospital and Its Needs."

Dr. Horace M. Simmons, former editor of the Maryland Medical Journal, and later associated with the *Hygienic and Dietetic Gazette*, and Mrs. Simmons, who have been spending some time in California, sailed on March 5 on board the Mongolia for Honolulu. They will also visit China and Japan.

Dr. Sidney H. Adler, University of Maryland Medical School, '07, of 2493 Broadway, New York city, who has been assistant to Dr. Samuel G. Gant of that city, has been appointed proctologist at the West Side German Dispensary.

Dr. Frederick Caruthers of 2229 East Baltimore street, who for the last seven weeks has been in Franklin Square Hospital undergoing treatment for an abscess of the jaw, has sufficiently recovered to leave the hospital.

Dr. Samuel C. Chew, who has been ill at his home, 3 Midvale road, Roland Park, is recovering.

At the annual meeting of the Board of Managers of the Baltimore Manual Labor School for Indigent Boys, held recently, Dr. Joseph T. Smith of 1117 North Eutaw street was reelected president. He was also named one of the directors.

The directors of the University of California, after looking over the relative attainments of many hospital organization specialists throughout the country, have selected Dr. Winford H. Smith, superintendent of the Johns Hopkins Hospital, to act as consultant of building organization and administration plans of the new $1,000,000 hospital to be erected in San Francisco in connection with the university. Dr. Smith has left for San Francisco and will be gone about two months. During his absence Dr. Rupert Norton will be in charge. During the last three years Dr. Smith has helped to plan the Phipps Psychiatric Clinic, the Harriet Lane Children's Hospital, the Brady Urological Clinic, and the Marburg Ward, the four big departments of the Johns Hopkins Hospital.

The thirty-ninth annual meeting of the American Academy of Medicine will be held

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in Atlantic City, June 19 to 22, 1914. With the exception of the Sunday afternoon conference, the various sessions will be held at the Hotel Dennis, which also will be the Academy headquarters.

Dr. J. McPherson Scott, secretary to the State Board of Medical Examiners, has been elected Mayor of Hagerstown for the third time.

Dr. Paul Wegefarth, formerly assistant to Dr. Harvey Cushing at the Peter Bent Brigham Hospital of Boston, has returned to Baltimore, where he will be one of the resident physicians at the Church Home and Infirmary.

Following the meeting of the International Association of Surgeons, which came to a close a few days ago in New York city, a large number—approximately seventy—distinguished surgeons from almost every country in Europe were the guests of the staff of the Johns Hopkins Hospital on the 18th inst. Their visit was for the exclusive purpose of seeing the work of Johns Hopkins Hospital.

In the afternoon Dr. Thomas S. Cullen held a clinic on rare diseases, and Max Broedel, the artist whose work in illustrating technical books on surgery is famous, spoke on the "Relation of Art to Medicine." Dr. W. H. Howell gave a demonstration in physiology and Dr. J. J. Abell in pharmacology.

The most important demonstration of the morning was by Dr. L. C. Rountree, associate of Dr. Abell, and Dr. J. T. Geraghty, associate of Dr. Young, on the new method of estimating the functions of the kidneys. At noon a luncheon was served.

Among the distinguished visitors was Professor Schuller of Germany, who, it is said, made the first X-ray of the human brain.

A recital for the benefit of the Maryland General Hospital was given by Mabel Garrison of the Metropolitan Opera Company at the Lyric, Thursday, April 30.

The hospital is preparing to improve its facilities by building a model surgery and nurses' home. The building recently vacated by the Baltimore Medical College is owned by the hospital, and as it adjoins the hospital it can be readily utilized for the extension of the hospital.

The Ladies' Auxiliary of the Hospital has already more than $4000 in the building fund, and it is hoped that the money derived from the entertainment will be sufficient to enable them to begin to build at once.

BIRTHS.

To Dr. Ronald T. Abercrombie, Johns Hopkins Medical School, '05, and Mrs. Abercrombie, of the Homewood Apartments, Baltimore, April 10, 1914, a daughter—Katherine Gordon. Dr. Abercrombie is a member of the faculty of the Johns Hopkins University.

DEATHS.

John G. Huck, M.D., Physicians and Surgeons, '82, of 647 West Lafayette avenue, Baltimore, died from heart disease at the Johns Hopkins Hospital, August 13, 1913, aged 59 years.

Dr. Ferdinand J. S. Gorgas, University of Maryland Medical School, '63, of 508 North Carey street, Baltimore, died at his home after an illness of two years of paralysis, April 8, 1914, aged 80 years. Besides being a medical graduate, Dr. Gorgas was a graduate of the dental department of the Baltimore College of Dental Surgery, and was dean of the dental department of the University of Maryland from 1882 to 1911. Prior to his connection with the University of Maryland, he was dean of the Baltimore College of Dental Surgery.

Oliver Kinsey, Jr., M.D., Johns Hopkins Medical School, '11, formerly of Kinsey, N. C., died suddenly in Washington, March 24, 1914, aged 28 years. Dr. Kinsey was formerly on the house staff at the Church Home and Infirmary.

John Thomas Shepherd, M.D., University of Maryland Medical School, '74, acting assistant surgeon U. S. P. H. S. at Chattanooga, Tenn., from 1888 to 1911; physician in the Hamilton County Hospital, and formerly president of the Hamilton County Board of Health; a member of the Association of Military Surgeons of the United States, a Confederate veteran, died at his home in Chattanooga, March 22, 1914, from valvular heart disease, aged 65 years.

James A. Cole, M.D., College of Physicians and Surgeons, '86, died at his home in Timmonsville, S. C., March 11, 1914.

J. Thor Rohm, M.D., College of Physicians and Surgeons, '80, for thirty years a practitioner of Redding, Cal.; once Mayor of that city, and for one term coroner of Shasta county, died at his home, March 31, 1914, from nephritis, aged 62 years.

J. Thornton Smith, M.D., Baltimore University, '90, died at his home in Chaneysville, Pa., January 31, 1914, aged 64 years.

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Abstracts.

FURTHER OBSERVATIONS ON THE SURGICAL ANATOMY OF THE LARGE BOWEL.

By Granville S. Hanes, M.D., Louisville, Ky.

Read before American Practologic Society, June 16-17, 1913.

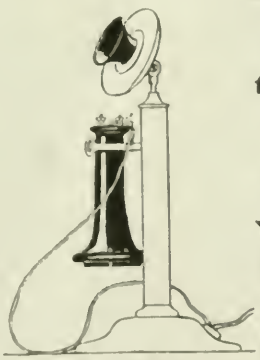
Few realize that the capacious portion of the colon is at its cecal extremity. The diameter of the average cecum is estimated at three inches, which is about the same as the rectum, though the cacum and ascending colon have a much greater capacity than the rectum and lower extremity of the sigmoid. The large intestine gradually decreases in size from the cecum to the rectum; the descending colon measuring one and one-half inches, or even less, at its narrowest point. These physical conditions explain, in a measure, the locality to which large quantities of fluids are transported when injected into the rectum.

The question of anti-peristalsis in the large intestine in man is yet to be settled. It has been suggested that anastalsis may be inferred to exist in the proximal human colon, for the reason that rectal enemas have been observed to traverse the entire length of the colon, and escape through an artificial opening in the cecum. Also, because surgeons have attempted to stop a fecal-fistula discharge by transplanting the ileum into the transverse colon and sigmoid, but without success. The fact that rectal enemas have been seen to pass through the cecal fistula is, he is confident, little evidence of the operation of an anti-peristaltic force.

An ordinary colon tube was introduced two or three inches into the rectum of a dog, and through a funnel inserted into the proximal end of the tube was poured in bismuth-buttermilk, and by the X-ray the author observed it traverse the large intestine to the ileo-cecal junction with no sign of anti-peristaltic movements. Similar experiments were made on children with corresponding observations. He has seen a pint of bismuth in suspension, when introduced into the rectum of an adult, pass around to the cecum in a few minutes with no evidence of aid by anastalsis.

Under normal conditions peristalsis in the large bowel is a slow process, and it is no more than natural to suppose that anastalsis is also slow in its operation. The brief time, then, required for fluids to pass from the rectum to the cecum compels us to consider the influence of other and more potent agents on the intestinal contents. Two factors are in operation when fluids are conveyed from the rectum to the cecum. The first is the distensible and elastic nature of the intestinal tube, and the second is the hydraulic principle which controls fluids wherever they may be. If fluid is forced rapidly into the rectum, that organ will be seen to be widely distended; but this same fluid can be seen to make its way up the intestinal tube along the path of least resistance. The distended rectum, because of its elastic nature, presses upon the contents till every drop of fluid within its lumen is subjected to an equal pressure. So if additional fluid is forced into the rectum, the same factors will continue to operate.

If the ileum is transplanted into the transverse colon or sigmoid, the watery intestinal contents will be forced by the elastic intestinal tube in the direction of least resistence. The right segment of the colon is the capacious portion of the large bowel, so



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if fluids are under greater intestinal pressure in the lower bowel, the fluid contents will travel up to the cecum.

The author says that even if we do admit the existence of anastalsis in normal conditions of the colon, he does not believe it to be an important factor in conveying fluids from the rectum up into the colon.

Hanes had a series of three X-ray pictures made on the same individual to show what actually happens when tubes are introduced into the bowel. The first shows a 13-inch proctoscope introduced its entire length. The distal end is one inch above the umbilicus. The second shows an ordinary colon tube introduced its full length after the removal of the protoscope. The tube passed along the sigmoid up to the highest point (one inch above the umbilicus), and then turned upon itself, the distal end passing back into the rectum. The third radiograph shows the bowel injected with bismuth buttermilk, and the 13-inch sigmoidoscope introduced again. This picture shows that it is impossible to pass any instrument high up in a normal colon, except by the greatest accident. The sigmoil is lifted up into the abdominal cavity; its lower arm is occupied by bismuth and the metal tube; while the upper segment of the sigmoid is seen very distinctly where it has dropped back from a point opposite the umbilicus into the pelvis to its junction with the lower extremity of the colon. He claims the latter radiograph proves that it is impossible to pass a non-flexible instrument beyond the first half of the sigmoid.

To control the outflow of the fecal material in colostomies the author has found, in five cases operated since January of this year, that the hard rubber rod can be allowed to remain permanently, when used as in the Maydl operation. The opening in the intestine is above the rod. A thin gauze dressing is applied over the bowel, and a strip of gauze is thrown around the knuckle of the intestine, and overlying gauze is then tied under the supporting rod. The strip of gauze constricts both the upper and lower segments of the bowel, and exerts a most satisfactory control over these artificial openings.

THE ANO-RECTAL LINE—ITS CLINICAL SIGNIFICANCE.

By Collier F. Martin, M.D., Philadelphia, Pa.

Read before American Practologic Society, June 16-17, 1913.

After discussing the development of the anus and rectum, Martin states that the ano rectal line, or dentate border, has a very important clinical significance, in that it is the point at which both the blood supply and the nerve supply become differentiated. Above it the blood is carried by the portal circulation to the liver, while below it the blood stream mingles with the general circulation by way of the inferior vena cava. Above it the rectum is supplied only with visceral or sympathetic nerve fibers, while below it the anus and its surrounding structures are supplied with spinal nerves, and by sympathetic filaments. These spinal nerves carry sensory impulses common to nerves having specialized cutaneous nerve-endings.

Below the ano rectal line, as evidence of irritation of the spinal innervation, sensory disturbances are expressed in terms of pain,

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itching, formication and in alterations in spinal sense of touch and temperature, with their modifications, such as dryness and moisture. Stimuli producing these sensory disturbances show their presence by exciting motor contraction, or by inducing alterations in secretion.

Above the ano rectal line all of the specialized spinal sensations are absent, only the visceral sensations being present. In the rectum it is only pressure and muscle-sense that appeal to our consciousness. This sensation is translated in the brain into a desire for stool, which desire is inhibited or assisted voluntarily, as occasion may require.

Excessive spasm of the involuntary muscles supplied by visceral nerves produces an unpleasant sensation, which differs from pain of spinal origin, in that it is difficult to localize, and may be described more as an ache, which is difficult to bear and exhausting to the patient.

Lesions of the crypts of Morgagni, since they involve both the visceral nerve supply of the rectum and the spinal innervation of the anus, are associated with many disturbances of the reflexes.

Infection and malignant processes occurring above the dentate border tend to spread upwards, by way of the deep lymphatics, to the pelvic, or uro-genital, organs, or to the liver, via the portal system. Below the ano rectal line superficial abscesses result from infections of the proctodeum and the rectal crypts. Malignancy here is associated frequently with extension to the inguinal glands.

In general there is a marked tendency for pathologic processes to limit their invasion to the embryonic structure in which they began; the ano rectal line being the "great divide" between the ectodermic and the entodermic structures. Rectal infection and malignancy rarely extend below the dentate border, while anal pathology usually remains below this line and the levator ani muscles.

Ano rectal symptomatology is equally differentiated. The subjective symptoms of a pathologic process bear little relationship to the lesion, per se, but depend upon the interference with the functions of the spinal or sympathetic nerve supply of the tissues involved, whether this interference be mechanical, inflammatory or functional.

THE DIETETIC TREATMENT OF BALDNESS.

The Medical Standard.

A Chicago physician comes out in the public press with the startling statement that baldness is due to improper food. It can be regained, he assures us, by right eating. This is tantalizing. Yes, it is cruel. To hold out the hope of assistance to the millions of sufferers from this disease without divulging the name of the dietetic emporium where the proper food may be procured will provoke a degree of anguish only equaled by that of offering a drink on the morning of January 1 to some man who was enthusiastically engaged in "swearing off" on the evening of December 31. For the good of science and the relief of his suffering brethren of the profession we hope that Dr. Silberman will tell us what to eat. We promise a faithful trial of his regimen.

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AN INTERESTING EXHIBIT IN MEDICINE AND SURGERY AT THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION.

One fact alone would make the exhibit in medicine and surgery at the Panama-Pacific International Exposition the most important of any similar display at any preceeding exposition, for, when the world comes to San Francisco in 1915 to celebrate the completion of the Panama Canal, it will be divided in admiration of the two men who, perhaps, above all others, are responsible, under the United States Government, for the successful termination of the gigantic work. And these two men are representatives of highest honor from the science of engineering and the science of medicine. Dr. William C. Gorgas, colonel in the United States Army Medical Corps, is the physician who undertook to preserve the lives of the canal builders in a land of malignant disease, while the toilers were operating under the guiding genius of the great Colonel George W. Goethals of the Corps of Engineers, United States Army.

Representatives of the science of medicine and surgery from every land under the sun will be present during the exposition to pay tribute to the doctor and incidentally to study the processes whereby the ravages of a disease-ridden zone were stayed and the camp of the canal builders became the abode of health.

The element that alone would lend a distinctive character to the exhibit is the featured presentation of the methods whereby the deadly mosquito was fought in his native haunts of morass and jungle; the application of specially-devised sanitary processes by which Dr. Gorgas and his men were victors in their struggle with deadly fevers, enervating malaria and others of the swarm of maladies that wait for men who penetrate those miasmic lands "where even the birds forget how to sing." A complete demonstration of these methods, as well as the equipment that, under man's uses, achieved success, will be installed for the advantage of the world by the United States Government. It will excite the interest not alone of the medical fraternity, but of all such nations as are interested in the colonization of the tropics.

The Emergency Hospital, another interesting feature of the exhibit in the department of medicine and surgery, scheduled in the exposition catalogue as "Group No. 35," will be a model emergency hospital, provided with its equipment entirely by exhibitors.

The law of averages works at expositions as elsewhere, and there will not be, even in 1915 in San Francisco, a suspension of the laws of gravitation, nor an annulment of the reactivities of cause and effect. Where a million people meet, there will be, in spite of all precautions to the contrary, cases of sickness, and the foolhardy will be subject to the usual percentage of disaster. Hence the necessity for an emergency hospital.

This emergency hospital will be a model equipped by the leading manufacturers of the country, with the best instruments and appliances, and stocked with every drug that physicians know.

Dr. R. N. Woodward, at present in charge of the United States Marine Hospital, situated near the Golden Gate, has been appointed by the Treasury Department to assume control of the emergency hospital at the exposition, and he has taken great pride

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It is not contemplated by the exposition's directorate that patients will be kept at the hospital over night, for it is to conform strictly to its classification as a hospital for emergency cases. If, however, the patient's health were to be jeopardized by removal to his home or to another hospital, he will not be removed.

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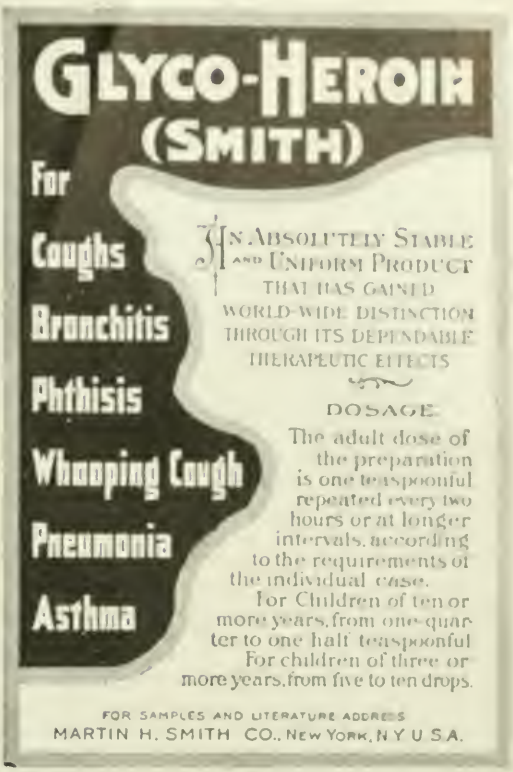
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¶ Stone, Brick and Steel Buildings, with every modern comfort. Two Elevators and five Sun Parlors.

¶ Convalescents can have specially prepared diets and other helps, and be under control and advice of home physician through our resident.

¶ Our Treatment Department includes Electric and Hydriatic Appliances of the latest style, with Sea Water. Trained attendants only.

F. L. YOUNG, General Manager

ELECTRIC COLLOID METALS

in Injectable Isotonic Stable Sterile SOLUTIONS

The "COLLOID" METALS "prepared" by ELECTRICITY in the CLIN LABORATORIES according to a special formula adopted after long researches are in the form of MINUTE particles.

They are absolutely pure, have the strongest catalytic action and are most effective both physiologically and therapeutically.

They do not deteriorate. They do not lose their efficiency.

Their stabilization is such that even after several months they retain their antiseptic power; this is easily ascertained by the extent of their catalytic action and their complete therapeutic efficiency, as proven by numerous clinical data.

ELECTRARGOL — Electric Colloid SILVER

ELECTROPLATINOL — Electric Colloid PLATINUM

ELECTRAUROL — Electric Colloid GOLD

ELECTROPALLADIOL — Electric Colloid PALLADIUM

IN BOXES OF 3 AMPOULES OF 10 c. c. Also IN BOXES OF 5 AMPOULES OF 5 c. c.
For intra-muscular Injections.

NOTE: **ELECTRARGOL** alone is also sold in special sterilized bottles of 50 and 100 c. c. for Surgical Use.

Therapeutic Indications: INFECTIOUS DISEASES IN GENERAL, GRIPPE, PNEUMONIA, PURULENT PLEURISY, TYPHOID FEVER, ERYSIPELAS, SEPTICEMIA, CEREBRO-SPINAL MENINGITIS, INFECTIOUS ENDOCARDITIS, MAMMARY ABSCESS (treatment without incision), GONORRHEAL & PUERPERAL affections, CYSTITIS, OPHTHALMIA.

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